Communications on
PURE AND APPLIED MATHEMATICS

A JOURNAL ISSUED BIMONTHLY BY
THE COURANT INSTITUTE OF MATHEMATICAL SCIENCES
NEW YORK UNIVERSITY

VOLUME XXXV • 1982

Founded by Richard Courant
with Kurt O. Friedrichs, Fritz John, and James J. Stoker
Managing Editor: Natascha A. Brunswick
Edited with the cooperation of the Faculty of the Courant Institute of Mathematical Sciences

An Interscience® Publication
Published by **JOHN WILEY & SONS**
New York–Chichester–Brisbane–Toronto–Singapore
© 1982 by John Wiley & Sons, Inc.

This journal publishes papers originating at or solicited by the Courant Institute of Mathematical Sciences of New York University. It is devoted mainly to contributions in the fields of applied mathematics and mathematical physics, and mathematical analysis.

Many of these papers are technical reports of the research performed under contract or grant from various research agencies of the United States Government; in such cases, reproduction in whole or in part is permitted for any official purpose of the United States Government.

Communications on Pure and Applied Mathematics (ISSN: 0010-3640) is published in six issues by John Wiley & Sons, Inc., 605 Third Avenue, New York, New York 10158. Copyright © 1982 by John Wiley & Sons, Inc. All rights reserved. Reproduction or translation of any part of this work beyond that permitted by Sections 107 and 108 of the United States Copyright Law without the permission of the copyright holder is unlawful.

The code and the copyright notice appearing at the bottom of the first page of an article in this journal indicate the copyright owner's consent that copies of the article may be made for personal or internal use or for the personal or internal use of specific clients on the condition that the copier pay for copying beyond that permitted by Sections 107 or 108 of the United States Copyright Law. The per-copy fee for each article appears after the dollar sign and is to be paid through the Copyright Clearance Center, Inc., 21 Congress St., Salem, MA 01970. (The fee for articles published prior to 1978 is $1.00 per article.) This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale. Such permission requests and other permission inquiries should be addressed to the publisher.

Subscription price: (**1983**): $130.00 per volume. Postage and handling outside U.S.A.: $25.00 by surface; $132.00 by air. Subscription correspondence should be sent to Journals Department, John Wiley & Sons, 605 Third Avenue, New York, New York 10158. Please allow four weeks for change of address. Back volumes, microfilm, and microfiche are available for previous years. Request price list from publisher.

The contents of this journal are indexed in: *Applied Mechanics Reviews*, *CompuMath*, *Current Contents/Physical, Chemical and Earth Sciences*, *Mathematical Reviews*, and *Science Citation Index*.

Postmaster: Send address changes to Subscription Department, John Wiley & Sons, Inc., 605 Third Avenue, New York, New York 10158.

Claims for undelivered copies must be made no later than three months following month of publication. Missing copies will be supplied when losses have been sustained in transit and where reserve stock will permit.

Second-class postage paid at New York, New York, and at additional offices.

Communications on

PURE AND APPLIED MATHEMATICS

Contents of Volume XXXV, Nos. 1–6, 1982

NUMBER 1, JANUARY

Regularity of the Dirichlet Problem for the Degenerate Complex Monge-Ampère Equation
R. Moriyón 1

Asymmetric Jet Flows
H. W. Alt, L. A. Caffarelli, and A. Friedman 29

Light Intensity Distribution in Conical Refraction
G. A. Uhlmann 69

Bifurcations with $O(3)$ Symmetry Including Applications to the Bénard Problem
M. Golubitsky and D. Schaeffer 81

Non-Linear Diffusion in a Finite Mass Medium
P. Rosenau and S. Kamin 113

NUMBER 2, MARCH

Singularities of Boundary Value Problems. II
R. B. Melrose and J. Sjöstrand 129

Propagation of Singularities for Hyperbolic Pseudodifferential Operators with Non-Smooth Coefficients
M. Beals and M. Reed 169

On the Denseness of Arithmetic Vectors
M. Hausman and H. N. Shapiro 185

A Specifically Nonlinear Property of the Operator Semigroup of the Navier-Stokes Equations
C. Foias and R. Teman 197

Brownian Motion and Harnack Inequality for Schrödinger Operators
M. Aizenman and B. Simon 209

NUMBER 3, MAY

On the Diffraction of Waves by Conical Singularities. I
J. Cheeger and M. Taylor 275

Classical Solutions of Fully Nonlinear, Convex, Second-Order Elliptic Equations
L. C. Evans 333

Numerical Analysis of Equilibria with Islands in Magnetohydrodynamics
O. Betancourt and P. Garabedian 365

Finite Difference Schemes for Conservation Laws
R. J. DiPerna 379

NUMBER 4, JULY

Motion of Slightly Compressible Fluids in a Bounded Domain. I
D. G. Ebin 451

On the Diffraction of Waves by Conical Singularities. II
J. Cheeger and M. Taylor 487

A Local Paley-Wiener Theorem for the Radon Transform of L_2 Functions in a Non-Euclidean Setting
P. D. Lax and R. S. Phillips 531

Propagation of Singularities in Non-Strictly Hyperbolic Semilinear Systems: Examples
J. Rauch and M. C. Reed 555

NUMBER 5, SEPTEMBER

Inverse Scattering and the Boussinesq Equation
P. Deift, C. Tomei, and E. Trubowitz 567

Compressible and Incompressible Fluids
S. Klainerman and A. Majda 629

Integrability of Hamiltonian Systems on Cantor Sets
J. Pöschel 653

The Existence of a Global Weak Solution to the Non-Linear Waterhammer Problem
M. Luskin and B. Temple 697

NUMBER 6, NOVEMBER

L^1 Stability of Traveling Waves with Applications to Convective Porous Media Flow
S. Osher and J. Ralston 737

Local L^p Estimates for Fourier-Airy Integral Operators
M. Beals 751

Partial Regularity of Suitable Weak Solutions of the Navier-Stokes Equations
L. Caffarelli, R. Kohn, and L. Nirenberg 771

Regularity Theorems for Weak Solutions of Some Nonlinear Systems
L. A. Caffarelli 833

Hyperbolic Systems with Different Time Scales
E. Tadmor 839

Author Index 867

Volume Title Page i

Volume Contents iii